ALABAMA PUBLIC SERVICE COMMISSION

COUNTY OF Hamilton
STATE OF Ohio

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared James W. Stegeman, who being by me first duly sworn deposed and said that he/she is appearing as a witness on behalf of BellSouth Telecommunications, Inc. before the Alabama Public Service Commission in Docket No. 29054, IN RE: Implementation of the Federal Communications Commission's Triennial Review Order (Phase II – Local Switching for Mass Market Customers), and if present before the Commission and duly sworn, his/her statements would be set forth in the annexed direct testimony consisting of 59 pages and 5 exhibits.

SWORN TO AND SUBSCRIBED BEFORE ME
THIS 16th DAY OF JANUARY, 2004

Notary Public

STEPHEN M. VOVAK
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXPIRES 09-22-07

DIRECT TESTIMONY OF JAMES W. STEGEMAN

ON BEHALF OF BELLSOUTH TELECOMMUNICATIONS, INC.

BEFORE THE ALABAMA PUBLIC SERVICE COMMISSION

DOCKET NUMBER 29054, PHASE II

JANUARY 20, 2004

Section 1. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS AFFILIATION.

A. My name is James W. Stegeman. I am the President of CostQuest Associates, Inc. I am testifying on behalf of BellSouth Telecommunications, Inc. ("BellSouth," "BST," or the "Company").

Q. PLEASE OUTLINE YOUR EXPERIENCE AND QUALIFICATIONS.

A. I have a Bachelors degree in Mathematics and Statistics and a Masters degree in Statistics from Miami University, Oxford, Ohio. Previously I was employed with Merrell Dow Research Institute, Cincinnati Bell Telephone, and INDETEC International. My work has included statistical evaluation of data, training, cost estimation, and financial analysis. I have developed systems and models to perform a variety of functions including the following: cost estimation; competitive assessment; product profitability; and budgeting.

Q. WHAT IS YOUR ROLE IN THIS PROCEEDING?

A. I led the design, development, and implementation of the BellSouth Analysis of Competitive Entry ("BACE") model that is being filed by BellSouth in this proceeding.

Q. WHAT IS YOUR EXPERIENCE WITH MODELS DESIGNED TO ESTIMATE THE PROFITABILITY/VIABILITY OF TELECOMMUNICATION PRODUCTS, MARKETS, AND FIRMS?

A. I was involved in the design, development, and implementation of numerous telecommunication profitability systems used throughout the world (systems in Hong Kong and the United States) including INDETEC's CPMS and ProfitMap systems. In fact, I just finished managing the design and implementation of a profitability model for a U.S.-based fiber overbuild company that sells bundled video, data and voice services.

Q. DO YOU HAVE EXPERIENCE WITH MODELS DESIGNED TO ESTIMATE THE COSTS OF TELEPHONE SERVICE AND ITS COMPONENTS?

A. Yes. I designed, coded and implemented the BellSouth Telecommunication Loop Model (BSTLM©) that was used in unbundled network element ("UNE") proceedings in eight of the nine of BST's states. I also developed the CostPro Loop model that is being used in a number of states in the U.S., and the Cost Proxy Model (CPM) currently in use in California. I assisted in the design, coding and implementation of the Benchmark Cost Proxy Model (BCPM). I designed the Universal Service Cost model adopted for use in Hong Kong and more recently the switching and transport portions of the universal service cost model used by the New Zealand Commerce Commission. I led the development of the Australian Universal Service Cost model, and consulted on the

development of similar costing models in Japan. I have also reviewed the HAI and HCPM models during their development.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. I describe the BellSouth Analysis of Competitive Entry (BACE) model (referred to as "BACE" or "the model"). This includes an overview of the model development, the basic approach employed in the model, the architecture, logic, and processing of the model, the data required, and the model's reporting capability. BellSouth witnesses Dr. Aron and Dr. Billingsley, discuss various inputs into the model, the assumed CLEC engineering used in the model, and the model results. A copy of the model, which is provided via CD, accompanies my testimony.

Q. BRIEFLY OUTLINE YOUR TESTIMONY.

A. The major sections of my testimony discuss the following topics:

1) Introduction.
2) BACE background. This includes a discussion of why the model was built, the nature of its development, and the fundamental approach employed by the model.
3) A discussion of how BACE is consistent with the Federal Communications Commission's ("FCC") Triennial Review Order ("TRO").
4) An overview of the model architecture, various processing steps, and a description of some of the advantages of BACE.
5) An overview of the BACE data requirements.
6) A discussion of price calculation in BACE.

7) A discussion of quantity calculation in BACE.

8) A discussion of revenue calculation in BACE.

9) A discussion of cost calculation in BACE, including optimization steps.

10) A discussion of tax calculation in BACE.

11) A discussion of the reports obtained from BACE.

12) A discussion of the tests performed on the BACE model.

For convenience, I have provided a list of acronyms used in this testimony as Exhibit JWS-1.

Section 2: <u>BACKGROUND</u>

Q. WHY WAS BACE BUILT?

A. In the proceedings leading up to the FCC's release of its TRO, BellSouth recognized that there would be a need for an economic model to determine if and where Competitive Local Exchange Carriers ("CLECs") would be impaired without access to BellSouth's unbundled switching. As a result, they commissioned CostQuest Associates to develop such a model.

Q. WHAT IS THE BASIC APPROACH TO THE CALCULATION OF IMPAIRMENT USED BY BACE?

A. BACE provides a framework to determine whether a CLEC can economically provide telecommunications-based service, without the ability to obtain unbundled switching

from the Incumbent Local Exchange Carrier ("ILEC"). BACE provides the framework to estimate the revenues available to CLECs in a geographic market and the outlays, or costs, CLECs will incur when providing services in that geographic market. The present value of the CLEC costs are compared to the present value of the CLEC revenues for specific geographic markets to determine the Net Present Value ("NPV") of CLEC entry for that market, using an appropriate network infrastructure. BellSouth witness Dr. Debra Aron explains how a positive NPV for CLECs in the geographic market being studied indicates an absence of impairment in that market.

Q. HOW IS THE BACE MODEL DOCUMENTED?

A. BACE has two forms of documentation, a Users Guide and a Methodology Manual. The BACE Users Guide is designed to help the user install the software, examine and modify study assumptions, and produce output reports. The BACE Methodology Manual discusses how BACE addresses applicable regulatory guidelines, follows standard economic and business practices, and calculates the cash inflows and outflows necessary to determine NPV during the study horizon.

I have attached to my testimony the BACE Users Guide as Exhibit JWS - 2, the BACE Model Methodology Manual as Exhibit JWS – 3, the BACE Model Source Code as Exhibit JWS-4, and the BACE Model itself on a CD as Exhibit JWS-5.

Section 3: <u>BACE IS CONSISTENT WITH THE TRO</u>

Q. WHAT IS YOUR UNDERSTANDING OF THE ROLE OF AN ECONOMIC MODEL IN ANY DECISION REGARDING WHETHER CLECS ARE IMPAIRED WITHOUT ACCESS TO ILEC SWITCHING?

A. My understanding is that state regulatory authorities are charged with considering three tests for impairment due to lack of the switching UNE in mass markets. The first two tests are "triggers" that involve an analysis of the existing levels of actual competition in relevant markets. The third test is more complex and involves an analysis of the viability of "potential deployment" where actual competition does not meet the "triggers" involved in the first two tests. In essence, the third test involves a determination of whether the absence of the switching UNE makes CLEC entry into a market uneconomic. As I understand this third test, an evaluation of any operational barriers to CLEC entry in the relevant geographic markets and an analysis of economic barriers must be made. BACE assists in the evaluation of whether there are any economic barriers to CLEC entry in a particular geographic market. All of these tests are discussed in the TRO (FCC 03-36, released August, 21, 2003).

Q. HOW DOES BACE RELATE TO THE TWO SWITCHING TRIGGERS IDENTIFIED BY THE FCC IN THE TRO?

A. BACE is not tied to the FCC's triggers tests. Instead, BACE is used in addressing the FCC's "potential deployment" analysis when examining a geographic market where the FCC's triggers do not lead to a required finding of no impairment. BACE allows the user to determine whether CLEC entry is uneconomic without access to the switching UNE, regardless of the triggers tests for impairment.

For ease of discussion, I will generally use the phrases impairment, or modeling impairment, to refer to the third test for impairment (for uneconomic CLEC entry) and not to the two triggers tests.

Q. DOES THE TRO PROVIDE GUIDANCE FOR STATE REGULATORY AUTHORITIES IN CONSIDERING UNECONOMIC ENTRY IN THE ABSENCE OF THE SWITCHING UNE FOR THE MASS MARKET?

A. Yes. While the TRO does not provide strict criteria, it does provide guidance in paragraphs 517-520. These paragraphs include the following headings: Evidence of Whether Entry is Economic (¶ 517); Potential Revenues (¶ 518); and Potential Costs (¶ 520). Other relevant language exists at paragraphs 472, 485, and 495.

Q. IN ORDER TO BE CONSISTENT WITH THE TRO, WHAT ARE THE MAJOR CHARACTERISTICS OF AN ECONOMIC MODEL TO BE USED TO EVALUATE CLEC ENTRY?

A. While I am not a lawyer and am not attempting to offer a legal opinion, my team has reviewed the order to understand what guidance the FCC has provided. Based on this reading, my familiarity with the FCC's past work involving modeling, and my familiarity with the requirements that the FCC has imposed on modeling over time, certain characteristics appear to be the basic building blocks that the FCC requires for an economic model that examines impairment. These characteristics are as follows: 1) the model must be capable of granular analysis; 2) the model must allow inputs consistent with an efficient CLEC business model and efficient CLEC network architecture; 3) the

model must incorporate all likely CLEC revenues and costs; and 4) the model must perform a business case analysis using Net Present Value (NPV) calculations.

Q. WITH RESPECT TO THE FIRST CHARACTERISTIC OF A MODEL, GRANULARITY, WHAT GUIDANCE DOES THE TRO PROVIDE WITH RESPECT TO AN ANALYSIS OF IMPAIRMENT?

A. The TRO notes the importance of granular analysis at several points. For example at ¶ 472 the FCC said "[w]e find that technical shortcomings in each of these studies [those studies filed previously with the FCC] preclude us from relying on their results to evaluate impairment at the national level. These shortcomings include…(2) insufficient granularity in their analyses." (Emphasis added). Also, at ¶ 485 the FCC stated "[a]ll of these studies…strongly support the need for a more granular analysis of impairment. We have insufficient evidence in the record, however, to conduct this granular analysis. Such an analysis would require complete information about UNE rates, retail rates, other revenue opportunities, wire center sizes, equipment costs, and other overhead and marketing costs. … That market-specific data is needed is indicated by the significant variation in the costs and revenues an efficient entrant is likely to face. For example, costs appear to vary significantly among locations and types of customers." (Emphasis added). Likewise, at ¶ 99 the FCC noted "[w]e will also give consideration to cost studies, business case analyses, and modeling if they provide evidence at a granular level concerning the ability of competitors to economically serve the market without the UNE in question." (Emphasis added).

Finally, at ¶ 495 the FCC stated "[r]ather, state commissions must define each market on a granular level, and in doing so they must take into consideration the locations of customers actually being served (if any) by competitors, the variation in factors affecting competitors' ability to serve each group of customers, and competitors' ability to target and serve specific markets economically and efficiently using currently available technologies." (Emphasis added).

Q. CONCERNING THE SECOND CHARACTERISTIC OF A MODEL, WHAT GUIDANCE DOES THE TRO PROVIDE WITH RESPECT TO AN EFFICIENT CLEC BUSINESS MODEL AND AN EFFICIENT CLEC NETWORK ARCHITECTURE?

A. At ¶ 517, the FCC found that "[s]pecifically, state commissions must determine whether entry is likely to be economic utilizing the most efficient network architecture available to an entrant. … The analysis must be based on the most efficient business model for entry rather than to any particular carrier's business model." (Emphasis added). At footnote 1579, the FCC said: "State Commissions should determine if entry is economic by conducting a business case analysis for an efficient entrant." (Emphasis added). Moreover at ¶ 495 the FCC said: " … competitors' ability to target and serve specific markets economically and efficiently using currently available technologies." (Emphasis added).

Q. TURNING TO THE THIRD CHARACTERISTIC OF A MODEL, WHAT GUIDANCE DOES THE TRO PROVIDE WITH RESPECT TO INCORPORATING ALL LIKELY CLEC COSTS AND REVENUES?

A. The TRO provides at ¶ 517 that "[i]n considering whether a competing carrier could economically serve the market without access to the incumbent's switch, the state commission must also consider the likely revenues and costs associated with local wire center mass market service, as detailed below." (Emphasis added). Thereafter, at footnote 1581, the TRO provides "[u]nlike in the *UNE Remand Order*, we do not intend that the availability of any UNE at state established wholesale (TELRIC) rates could by itself constitute impairment without considering all costs and revenues in a business case analysis." (Emphasis added).

Also, the Final Rules, set forth in Appendix B, CFR § 51.319(d)(2)(iii)(B)(3), states "[s]pecifically, the state commission shall examine whether the costs of migrating incumbent LEC loops to requesting telecommunications carriers' switches or the costs of backhauling voice circuits to requesting telecommunications carriers' switches from the end offices serving their end users render entry uneconomic for requesting telecommunications carriers." (Emphasis added).

Q. DOES THE TRO PROVIDE ADDITIONAL DETAIL WITH RESPECT TO INCORPORATING ALL LIKELY CLEC REVENUES?

A. Yes. At ¶ 519 the TRO states "… [i]n determining the likely revenues available to a competing carrier in a given market, the state commission must consider *all* revenues that will derive from service to the mass market, based on the most efficient business model for entry. These potential revenues include those associated with providing voice services, including (but not restricted to) the basic retail price charged to the customer, the sale of vertical features, universal service payments, access charges, subscriber line

charges, and, if any, toll revenues. The state must also consider the revenues a competitor is likely to obtain from using its facilities for providing data and long distance services and from serving business customers." (italics in the original, underline added).

Q. DOES THE TRO PROVIDE ADDITIONAL DETAIL WITH RESPECT TO INCORPORATING ALL LIKELY CLEC COSTS?

A. Yes. At ¶ 520 the TRO provides under the heading, *Potential Costs*, that "[s]imilarly, the state must consider all factors affecting the costs faced by a competitor providing local wire center service to the mass market. If the state commission determines that a UNE-L strategy is the most efficient means of serving the customer, these costs would likely include (among others): the cost of purchasing and installing a switch; the recurring and non-recurring charges paid to the incumbent LEC for loops, collocations, transport, hot cuts, OSS, signaling, and other services and equipment necessary to access the loop; the cost of collocation and equipment necessary to serve local wire center customers in a wire center, taking into consideration an entrant's likely market share, the scale economies inherent to serving a wire center, and the line density of the wire center; the cost of backhauling the local traffic to the competitor's switch; other costs associated with transferring the customer's service over to the competitor; the impact of churn on the cost of customer acquisitions; the cost of maintenance, operations, and other administrative activities; and the competitors' capital costs. State commissions should pay particular attention to the impact of migration and backhaul costs on competitors' ability to serve the market. …"

Q. TURNING TO THE FOURTH AND FINAL CHARACTERISTIC OF A MODEL, WHAT GUIDANCE DOES THE TRO PROVIDE WITH RESPECT TO A BUSINESS CASE ANALYSIS?

A. The TRO uses the phrase "business case analysis[analyses]" at several points, including footnote 1579. This phrase was also used in citations in the preceding three questions and answers. Similarly, at footnote 1579, the TRO states "…[e]ven if interconnection and unbundling are performed as efficiently as is technically feasible, these costs must still be considered in our business case analysis to determine whether entry is uneconomic without access to a particular network element." (Emphasis added).

Q. WHAT GUIDANCE DOES THE TRO PROVIDE WITH RESPECT TO THE USE OF NET PRESENT VALUE (NPV)?

A. At footnote 260, the following language is included: "… Stated in more technical terms, the condition [of a firm entering the market, and hence no-impairment] is whether the net present value of the expected economic profit is positive." (Emphasis added).

Q. IS BACE'S APPROACH TO DETERMINING IMPAIRMENT CONSISTENT WITH THE TRO?

A. Yes. BACE was developed to determine whether CLEC entry is economic in the absence of the switching UNE. In creating BACE, BellSouth was keenly aware of the FCC's finding of prior modeling deficiencies and of the needs and requirements of an impairment model in meeting a state commission's need to implement the TRO.

Q. IS BACE GRANULAR IN ITS APPROACH?

A. Yes, BACE is very granular in its approach. The model allows the user to input complete information about UNE rates, retail rates and other revenue opportunities specific to each market. BACE allows variations in product offerings and average revenues per customer across five customer segments (residential and four business segments) and by customer-spend categories within each customer segment. The model provides for bundles of product and service offerings and price discounts. In addition, BACE identifies the specific operational and capital cost requirements of the CLEC in rolling out its network. Finally, cost and revenue information is developed at the wire center level, thereby allowing the user to roll the results up to any geographic level. The current geographic levels of analysis possible include:

a. LATAs;

b. Wire centers;

c. MSAs (Metropolitan Statistical Areas), as defined in 1990 and used in the FCC's special access decision;

d. MCSAs (Micropolitan Statistical Areas), as defined in 2003 by the OMB in its definition of MSAs and MCSAs;

e. CEAs (Component Economic Area);

f. UNE Zones; and

g. Any combination of the above.

Q. DOES BACE ALLOW THE USER TO EMPLOY INPUTS AND CHOICES THAT ARE CONSISTENT WITH AN EFFICIENT CLEC BUSINESS MODEL AND EFFICIENT CLEC ARCHITECTURE?

A. Yes. BACE provides user adjustable toggles and user input choices that are consistent with an efficient CLEC business model and an efficient CLEC architecture. For example, the model allows for least-cost choices of architecture (e.g., EELs or collocation); concentrates traffic to take advantage of cost savings; determines whether DSL offerings are economic; and determines whether entry into a geographic market and/or LATA is efficient using a business case analysis approach.

For reasons of practicality, the user of the model cannot consider every possible network architecture, potential product offerings, or business plan approach that a CLEC might choose. The purpose of the model is to replicate the business plan and architecture of an efficient CLEC, however. The model was built to allow the user to enter markets selectively and control the major choices and architectures available to a CLEC.

Q. DOES BACE HAVE THE ABILITY TO REFLECT THE EFFICIENT USE OF CURRENTLY AVAILABLE TECHNOLOGIES?

A. Yes. In developing BACE, my team designed the platform to accommodate numerous potential network inputs to allow the user to deploy an efficient CLEC network architecture. In creating this model approach, I relied upon network specialists from BellSouth to provide a description of the specific network components required for a CLEC to provide the modeled services, using currently available technologies. This includes both CLEC capital investments (e.g., cash outlays for switches) and the use of unbundled network elements and wholesale services/components. This assumed network architecture is described in more detail in the testimony of BellSouth witness Mr. Keith Milner.

Q. DOES BACE ALLOW THE USER TO CONSIDER ALL CLEC REVENUES AND COSTS?

A. BACE is designed to let the user capture all CLEC costs including those capital outlays for CLEC-owned investments and the major sources of CLEC revenues, including: local service; vertical features; voice mail; long distance and switched access, data services including Digital Subscriber Line (DSL); line maintenance; service connection/installation; directory assistance; and data services. I would note, however, that BACE does not consider video services, programming or other services that a CLEC may offer and which may generate an additional value for the CLEC. Also, to the extent that a CLEC might create some brand new service that might generate additional revenues, such revenues would not be included in the model, but such products and revenues should improve the CLEC's ability to enter a market even further. Nonetheless, the services that are currently modeled in BACE are likely to represent the great majority of the services that CLECs will offer and that have been outlined in the TRO.

Q. DOES BACE PROVIDE A PLATFORM FOR A BUSINESS CASE ANALYSIS OF THE CLEC ENTRY DECISION?

A. Yes. BACE was specifically designed to evaluate whether CLEC entry is economic for user-defined markets, using a business case analysis approach. The model considers prices, market penetrations, and costs by market segment, by geography and by year. The potential for bundling of services is considered, as are opportunities for CLECs to make rational choices about their footprint by not serving some geographic areas and choosing between service approaches (EELs or collocation). Moreover, BACE uses a

discounted cash flow approach in evaluating the cash outflows (costs) and cash inflows (revenues) over time. Tax liabilities are also estimated and the final cash flows are discounted to net present value. In addition to the NPV calculations, BACE also provides estimates of accounting net income and cash flow over time. In total, the model provides the framework to perform a reasonable business case analysis for evaluating a CLEC entry decision.

Q. HOW DOES BACE PERFORM NET PRESENT VALUE CALCULATIONS?

A. The Net Present Value of a stream of cash flows is the difference between the present value of the cash inflows and the present value of the cash outflows. In other words, $NPV=PV_{inflows}-PV_{outflows.}$ The Present Value (PV) of a cash flow is today's value of a cash in-flow (or out-flow) received (or paid) at some time in the future. Present Value takes into account the effects of the time value of money (which is reflected in the interest rate or discount rate). Present Value is calculated by applying the discount rate to the cash flow. In other words, $PV=FutureValue/(1+i)^t$, where i is the annual interest rate (discount rate) and t is the number of annual periods. BACE calculates the discount rate i from user adjustable inputs. The annual periods in BACE are based upon a mid-year convention. That is, any cash transaction (e.g., an expenditure) that occurs during each year is assumed to occur, for present value purposes, at the mid point of the company's fiscal year. The exception to this rule is that BACE assumes that all initial start-up costs are assumed to occur at time zero and therefore require no present value adjustment.

Section 4: <u>OVERVIEW OF THE MODEL ARCHITECTURE, VARIOUS PROCESSING STEPS, AND A DESCRIPTION OF SOME OF THE ADVANTAGES OF BACE</u>

Q. WHAT CLEC CHARACTERISTICS AND RELATED FACTORS DOES BACE TAKE INTO ACCOUNT?

A. The model accounts for the following CLEC characteristics and related factors:

CLEC Size – recognizing that there are different sizes of CLECs, the model accounts for the key implications of the CLEC's size (e.g., impact on purchasing power, cost implications of outsourcing certain functions, etc.).

Customers – the model accounts for how many customers in total reside in the relevant markets, how many customers the CLEC might expect to serve (i.e., the CLEC market share), and the types of customers the CLEC will attract (e.g., what types and sizes of customers, and what products and services will they buy). It also accounts for how much customers will pay and the level of customer churn that may be experienced.

Products – the model accounts for the typical products the CLEC might offer, how those products may be bundled, and the implications of bundling on prices and customer take rates.

Quantities – the model accounts for the quantities of products to be sold to those customers choosing CLEC service.

Pricing – the model develops initial prices using user inputs, initial CLEC price discounts, and product price changes over time.

Network Costs – the model accounts for the network infrastructure requirements specific to the markets, customer profiles, and product portfolios being modeled and how those network requirements might be met (e.g., lease or own).

Operational Costs – the model accounts for the nature and level of CLEC operating costs allowing for effects due to the size of the modeled CLEC.

Trends – the model accounts for the changes that might be experienced over a ten-year period (e.g., customer buying behavior trends, pricing trends, and cost trends).

Optimization – the model allows the user to assume that the CLEC management team will use reasonable judgment and as such may decide not to serve unprofitable products and markets. The user can control the degree to which a CLEC could/would identify unprofitable sub-markets and avoid service in such sub-markets.

Sensitivity of Assumptions – the model allows the user to create scenarios and analyze the impact of assumptions upon the financial metrics of impairment. Within the components (and inputs) outlined above, the BACE model computes a) the CLEC market share achieved (i.e., percentage of products purchased by market segment, by territory), b) the resulting revenue (including the impact of product bundling), and c) the network and operational costs incurred in serving the market (considering the implications of CLEC size).

The model allows the inputs and assumptions to change over a ten-year period as the CLEC grows, costs change, and as anticipated price trends are realized. The results are

presented in terms of the anticipated cash flows for the ten-year period and the associated net present value calculated from the user adjustable discount rate.

Q. WOULD YOU PLEASE PROVIDE A BASIC OVERVIEW OF THE MODEL AND ITS ARCHITECTURE?

A. Yes. First, BACE allows the user to identify which products and services the CLEC will choose to offer. Second, BACE develops a price for products or groups of products (bundles) for each customer segment. This is the task of the "P-Process" within the model. Third, after the price has been established, a quantity demanded for each service or group of services in each wire center must be calculated. I will generally refer to "demand" to mean the quantity demanded and actually sold. This is the task of the "Q-Process" within the model.

Fourth, knowing the Price (P) and Quantity Demanded (Q) of each service or group of services, BACE can derive the total Revenue (P*Q) by product, location, and customer segment (and customer-spend sub-segment). Calculating the Revenue is the task of the "R-Process." Knowing the Gross Revenue available to the firm represents the total cash inflow for the period.

Fifth, cash outflows are calculated in the Operations and Network Process ("ON-Process"). This process is dependent upon the outputs of the P, Q, and R processes. The O portion of the ON-Process derives those expenses that are operationally associated with the firm. For example, Sales, General and Administrative (SG&A), is an operational expense. The N portion of the ON-Process derives those outflows necessary to create a

network sufficient to handle the voice and data traffic identified in the Quantity Process. In other words, the cash expenditures involved with setting up, maintaining, and growing the telecommunications network.

Sixth, seven optimization routines provide the opportunity to drop negative NPV products and geographic areas (six of which can be toggled on/off by the user).

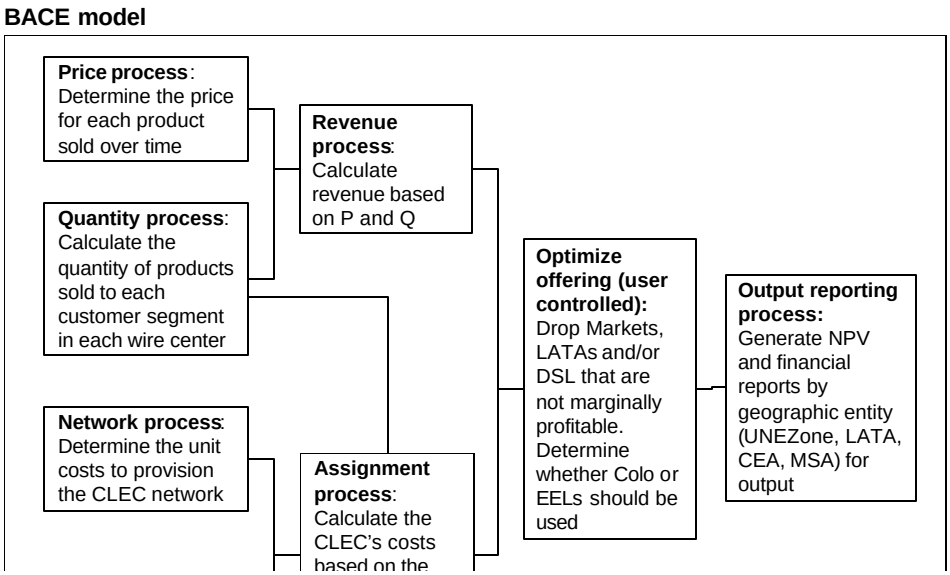
Seventh, income taxes are determined based on the year-by-year income and expenses of the modeled firm. These tax calculations allow for various treatments of tax losses and allow the user to input state-specific tax rates.

Eighth, output reports are generated reflecting NPV by geographic entity, and/or accounting-like net income statements.

Q. CAN YOU PLEASE PROVIDE A VISUAL REPRESENTATION OF THE MODEL ARCHETECTURE?

A. Yes, the table below provides a visual representation of the BACE architecture:

SIMPLIFIED PROCESS FLOW



Q. HOW IS USER INPUT AND PROCESSED OUTPUT DATA STORED AND UTILIZED IN BACE?

A. BACE retrieves and stores all input and output data in a consistent and logical format. Input and processed data are stored as a scenario database. Each scenario is a Microsoft Access database stored in a like-named folder within the scenario directory. Report data are stored in the same directory. Reports are created as either Microsoft Excel worksheet files or Excel compatible, comma separated variables (CSV) files.

Q. HOW DOES BACE ORGANIZE THE STUDY DATA?

A. BACE organizes study data in two ways: Scenarios and Inputs. A named collection of all Inputs used in a study is called a Scenario. The Scenario is the large-scale way of storing all study assumptions and inputs. Within a Scenario, there are a series of tables used to manage individual inputs. Inputs are logically grouped and displayed within a table structure. Common tables are organized into groups. Data can be reviewed and managed manually or via a user-friendly wizard.

Q. IS THERE A HIERARCHY AMONG DATA COMPONENTS?

A. Yes, BACE uses four sets of hierarchies to drive cash flow calculations and reporting: location, customer, product, and cost. Hierarchies are necessary to allow the user to define, at a particular level, specifically how a cost or revenue is triggered (e.g., by line, minute, or initial provision of service in a LATA). The use of hierarchies allows cost and revenue drivers to be set and output structured in a way as to make the cost and revenue implications of these actions clear and traceable to levels at which reporting will occur.

The location hierarchy is used to specify from broad levels of geography to narrow levels. The reason the location hierarchy is important is that certain costs are location specific, e.g., a switch placed in a LATA. The customer hierarchy allows the user to trigger certain costs or revenues based upon specific attributes of customer classes or segments. For example, certain costs should be attributed a business customer (equipment to provide DS1 data service rather than DSL), but not a residential customer. The product hierarchy is similarly designed. It allows granular identification of products. And finally, the cost hierarchy is designed to let the user input a logical structure of the inputs that in turn flow to a logical structure in the reporting output.

Q. WHAT ARE SOME OF THE KEY ADVANTAGES OF BACE?

A. Many of the key advantages of BACE correspond to the characteristics that make BACE consistent with the FCC's TRO; BACE: 1) is granular in its analysis; 2) allows the user to provide inputs consistent with an efficient CLEC business model and architecture; 3) incorporates likely CLEC revenues and costs; and 4) performs a business case analysis using net present value.

Many of the other advantages of BACE are embodied in the abilities of the model that the user can decide to use (or not use) and the degree of control the user has over the inputs and the impairment analysis. The user can adjust, control, and consider (or not consider) the following factors (not an exhaustive list): 1) prices, 2) market penetration, 3) cost levels, 4) cost drivers (i.e., how costs are assigned); 5) whether some forms of optimization will occur; 6) whether to use a wizard or perform calculations "manually" (i.e., without the wizard); 7) the types of reports generated; 8) consider NPV and/or accounting metrics; 9) trends in many of the factors above over time; and 10) size and scope of the CLEC's operations.

Another advantage of BACE is that it uses a scenario structure to allow the user to bundle assumptions together into a scenario that identifies the inputs and outputs that correspond with one another. By maintaining a separate inputs database and reporting structure for each scenario, BACE simplifies what-if analysis and sensitivity tests.

Section 5: <u>OVERVIEW OF THE BACE DATA REQUIREMENTS.</u>

Q. WHAT TYPES OF DATA DOES BACE USE?

A. BACE uses six broad categories of data: 1) customer, 2) products and services, 3) price, 4) quantity, 5) CLEC properties; and 6) cost.

Q. WHAT CUSTOMER DATA IS USED BY BACE?

A. Total market (CLEC plus ILEC) customer data is required by wire center, by customer segment (residential and four business segments) and by customer spend level (high to low level groupings of customers). BACE imports a Wire center Demographic table that provides total customer population for each BellSouth wire center. BACE uses one residential segment and four business segments: 1) 1-3 line small office/home office (SOHO in the model); 2) 4-8 lines small-sized business (SME/A in the model); 3) 9-23 line medium-sized business (SME/B in the model); and 4) 24+ line large-sized business (SME/C in the model). Each customer segment is further divided into categories based on the amount of customer spending. The residential segment is divided across the state into five spend categories (quintiles) with an equal number of customers in each. Each of the four business segments is divided across the state into three spend categories (high spend, medium spend, and low spend) with an equal number of customers in each. Since the expenditure categories are determined at the state level, each wire center will contain a unique profile and count of the customer segment /spend data.

Q. WHICH PRODUCTS AND SERVICES ARE INCLUDED IN BACE?

A. BACE allows for consideration of the following types of services: local access; custom calling features, long distance usage, and switched access; Digital Subscriber Line (DSL); DS1 Internet access; line maintenance; service connection/installation; and directory assistance. The user has the ability to determine whether the CLEC sells a service and/or whether there is a non-zero, positive price for each service. As noted in Section 3 above, BACE represents the great majority of telecommunication services that are likely to be offered, but not the absolute scope of services that might be offered (e.g., video is not included).

Q. WHAT PRICE DATA IS USED BY BACE?

A. BACE requires a baseline price file that contains the current market price for each of the products offered, by customer segments, by customer-spend categories. BACE uses six main product classifications: 1) long distance services; 2) voice mail; 3) switched access services (payments by long distance/inter-exchange carriers to terminate local calls to CLEC customers); 4) DSL (standard high-speed connection); 5) non-DSL business data service; and 6) Local (this includes local access, local usage, subscriber line charge (SLC), directory assistance (DA)/operator services, and custom calling features other than voice mail. BACE allows the user to include separate prices, quantities, and revenues for line maintenance if the user has the relevant values, including quantities, for this service.

BACE also recognizes the current market trend of bundling by allowing the user to identify bundles of services, and prices (or price discounts) for the bundled offerings.

In addition, BACE allows the user to change each price in each year over the 10-year study period.

Q. WHAT QUANTITY DATA IS USED BY BACE?

A. "Quantity" is a term that BACE uses to refer the number of products or services demanded and actually sold, not the number of customers. BACE uses quantities by wire center, for each of the products offered, by customer segment, by customer-spend category. Note the user has the option to establish zero quantities for some segments

(e.g., no sales of non-DSL data services to residential customers). BACE also allows for the quantities of products and services that are sold in bundles, as well as those sold a-la-carte. In addition, quantities can change by year over the 10-year study period.

Q. WHAT CLEC GLOBAL PROPERTIES DATA ARE USED BY BACE?

A. The "CLEC global properties data" inputs are those that define the characteristics of the CLEC and how it performs its business. These inputs consist of four basic types: 1) those that act as filters; 2) those that act as descriptors; 3) those whose value will have an impact on calculated values; and 4) those that are toggles for optimization.

Filter inputs tell BACE whether a value should be used or filtered out. An example of such a filter input is whether to include (or not) a terminal value for CLEC assets at the end of the 10-year study period. Descriptor data inputs are optional and can be used for documentation and informational purposes only. Many of the CLEC properties data inputs have values that are used in the calculations. These include: tax rates, equity percentage, pre-tax cost of capital, and scope of CLEC operations contained within the BellSouth service territory. And finally, toggles for optimization control how BACE optimizes the CLEC's business offerings within a state. This includes analyses of product offerings for the efficient operating footprint of the firm.

Section 6: <u>THE PRICE CALCULATIONS IN BACE.</u>

Q. CAN YOU DESCRIBE THE PRICE PROCESS (P-PROCESS)?

A. Yes. As noted above, the Price Process (P-Process) derives the market prices for each of the six main products and product bundles offered by the CLEC, by customer segment, by year.

The challenge in the P-Process is to find not only the per-unit price for each individual product sold, but also to account for the implied price of individual products sold as components within bundles. In BACE, a bundle is a group of products or services that are sold together as a single unit. The user defines each bundle and its component products in the Bundles Table. In order to generate inputs for BACE's Revenue Process (R-Process), implied "prices" for each product/component of a bundle are imputed and stored. This implied or imputed price approach for bundled product/components allows for revenue calculation and reporting of revenues at distinct levels along the location and customer hierarchies.

Q. WHAT INPUTS ARE REQUIRED FOR THE P-PROCESS?

A. Several tables provide input to the P(price) Process. The tables and their key input fields are described below. The relevant tables can be thought of as having two characteristic dimensions: 1) bundles versus *à-la-carte*; and 2) starting versus future prices.

The following tables are used in the P-Process:

Baseline Bundle Price - This table defines the initial bundle prices offered to each customer segment in a defined geographic area.

Bundle Price Curves - This table defines the price trend (expressed as a decimal) per year for each product bundle over the ten-year study. This will capture any expected bundle price increases or decreases over time.

Baseline Product Price - This table defines the current prices of individual products by geographic area. The values in this table can be thought of as representing initial market prices off of which the user can apply a CLEC discount. This discount may reflect the market entry discount to expand market share.

Baseline Bundle Price - This table defines the current prices of the bundles by geographic area.

Product Price Curves – This table defines the price trend (expressed as a decimal) per year for each product over the ten-year study. The values in this table will capture any increase or decrease in product prices over time. (Note that in BACE, the term "curve" is used to reflect changes in values over time, by year, during the 10-year modeling period).

CLEC Baseline Price Discount - This table defines any discounts off of the current prices and is used to create the initial CLEC prices of individual products by geographic area.

Q. WHAT TASKS ARE PERFORMED BY BACE DURING THE P-PROCESS?

A. Once the tables described above are populated, BACE performs seven key tasks (or categories of tasks) during the P-Process. The first three tasks develop prices for individual products and bundles, while the later three tasks relate to the prices that are implied for the components of bundles.

The first task is to create the bundle price profile over time. This is done by multiplying the initial bundle price (Baseline Bundle Price) by the bundle price curves (Bundle Price Curves table). The Bundle Price Curves table reflects changes in bundle prices over time. This task calculates a price per bundle per year for every year, for each relevant market. This information is added to the BACE processing table P1.

The second task is to develop the initial discounted price for each product by applying the CLEC pricing discount to the Baseline Product Price. This task discounts current baseline market-like prices for assumed CLEC discount levels. This information is added to the BACE processing table P2 (e.g., baseline CLEC price per product, per market).

The third task is to calculate the CLEC product price profile over time. This is done by multiplying the initial discounted product price (found in table P2) by the CLEC price curves (in the Product Price Curves table). This leads to a calculation of the CLEC à-*la-carte* product price for each year. This information is added to the BACE processing table P3.

Q. PLEASE DESCRIBE THE P-PROCESS TASKS RELATED TO THE IMPLIED PRICES FOR SERVICES WITHIN A BUNDLE.

A. During the fourth task, using the *à-la-carte* product price in table P3, these inputs are combined with the Bundle table to find the sum of *à-la-carte* prices in a given bundle in a given area by year. This derives the price that would exist if the bundle were sold at list or retail price for each of the individual components (i.e., at *à-la-carte* prices). This information is appended into the BACE processing table P4.

Fifth, bundle adjustment factors are determined for each product in each market. By comparing the sum of *à-la-carte* prices in table P4 (for a given customer bundle in a given area with actual demand levels) with the actual bundle price for the same area and customer group (table P1), a retail price to bundle price adjustment factor can be calculated. The user has the ability to indicate to which products within the bundle this adjustment should be applied. The resulting adjustment factor is added into the BACE processing table P5.

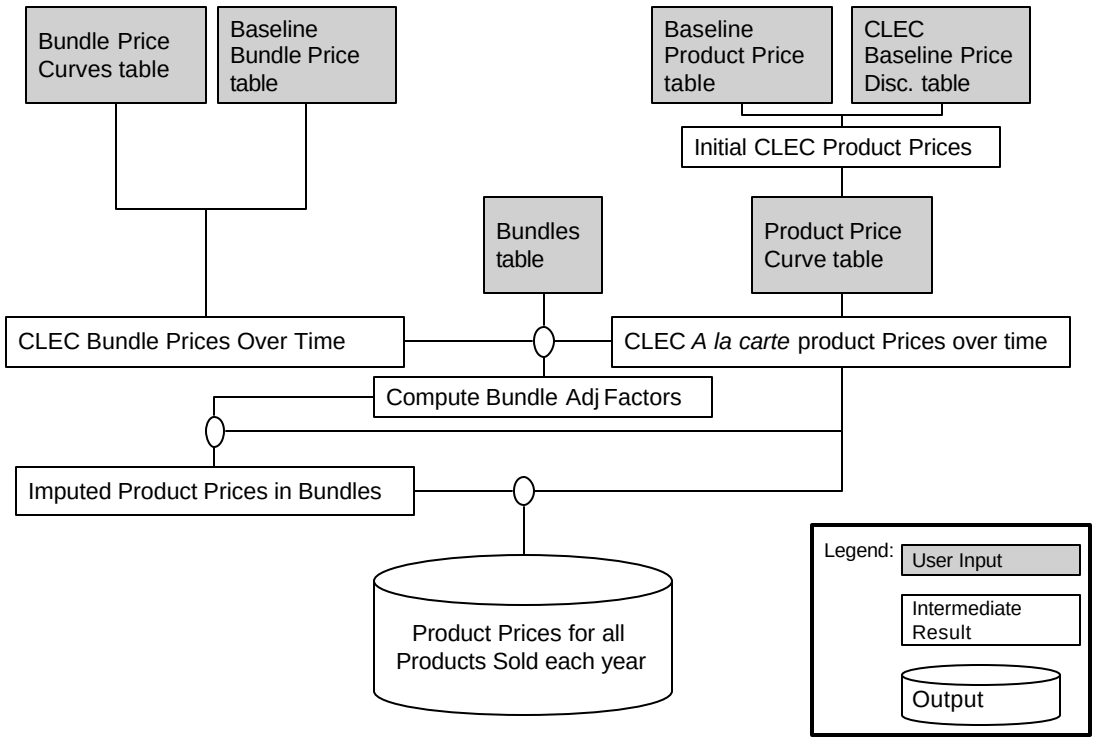
The sixth task is to determine the implied or imputed product prices for each product (this is controlled by the user as noted in the prior paragraph) within the bundles. This is accomplished by multiplying bundle adjustment factors from P5 for each bundle by the a-la-carte prices for each bundle component. As noted above, the user has the option of excluding bundle components from this discounting process. At this stage, BACE has determined the per-unit product price (or implied price) for each individual product offered a-la-carte, and within each bundle by all levels of location and customer hierarchy.

The seventh task is to append these product prices (both *à-la-carte* and bundles) into the BACE processing master pricing table, PMaster. All prices that were established on an *à-la-carte* basis have "*à-la-carte*" appended into the bundle field.

Q. CAN YOU ILLUSTRATE THE P-PROCESS WITH A DIAGRAM?

A. Yes, a diagram summarizing the P-Process is shown below:

P-Process: Determine the Price for *a la carte* and bundled product offerings



Section 7: <u>THE QUANTITY CALCULATIONS IN BACE (Q-PROCESS)</u>

Q. WHAT IS THE PURPOSE OF THE QUANTITY PROCESS (Q-PROCESS)?

A. The Quantity Process (Q-Process) derives the quantity demanded/sold for each product and service offered by the CLEC. Calculating the quantity demanded of CLEC products takes into account customer segment demographics, anticipated CLEC market share, year of product rollout, and anticipated customer churn (disconnects).

The starting point for BACE's Q-Process is a set of user input tables necessary to calculate CLEC quantities.

Q. WHAT TABLES ARE NEEDED FOR THE Q-PROCESS?

A. In addition to the demographics tables (described in Section 5 above), users provide additional input in the following tables:

CLEC Profile Products - This table allows the user to indicate which products are offered by the CLEC and within what study year the product is first offered. Beyond the first year, the user can also input the product's last offering year.

Baseline Demand - The Baseline Demand table describes the expected initial demand for products and services offered by the CLEC.

Demand Curves - The Demand Curves table describes the total anticipated market demand change for each product by customer segment, by customer-spend category, by year for study years 2 through 10.

Penetration Curves for Products - This table describes the anticipated CLEC market share of customers for each product by customer type over the ten-year study horizon. This table relies upon user adjustable inputs, and also allows the user to tie product penetration to DSL Addressability.

Churn - This table allows the user to describe the annual churn for each customer grouping for each product offered by the CLEC. For BACE, churn is described in terms of disconnects each year by product.

Bundles - The Bundles table describes those products and services that are sold within each bundle.

CLEC Profile Bundles - This table allows the user to indicate which bundles are offered by the CLEC and within what study year the bundle is first offered. Beyond the first year, the user can also input the bundle's ending year.

Penetration Curves For Bundles - This table allows the user to determine the proportion of CLEC customers whose product sales occur via bundles, by year, by customer segment and customer-spend category, over the ten-year study horizon. For example, a penetration rate of .5 indicates that 50% of the customers of the CLEC for a particular customer segment subscribe to the CLEC services through bundles.

Market Growth – This table allow the user to indicate how the current customer base will grow over time. This represents the growth of population and businesses over time.

Q. WHAT TASKS ARE PERFORMED IN THE Q-PROCESS?

A. Given the contents of the demographics and user input tables, BACE performs ten key Q-process tasks. The first six tasks are related to the calculation of the number of customers subscribing to products, by type and location, the CLEC will serve over time. A key concept to understand is that there is a CLEC market penetration of customers, and then

within those customers, a market penetration of the CLEC products. For example, a CLEC may sign up a customer that takes local service and DSL, but chooses a different carrier for long distance services.

In the first task, BACE develops the CLEC customer penetration for each product on a percentage basis. This key data is contained in the Penetration Curves for Products table. This table contains the product records defining the "anchor" product the customer will buy. In effect, this defines the customer count for the CLEC. This table also contains non-anchor product penetrations. These penetration values are applied against the anchor penetration percentages to derive the customer penetration for the various non-anchor products. This data is adjusted to match the first year the CLEC offers each product. This is done by extracting from the CLEC Profile Products table the first year for which the CLEC offers the product or service, and adjusting the market share per period found in the Penetration Curves for Products table. The starting year is used to reflect the CLEC market share in the first year the product is offered. After the ending year (if it occurs before the end of the study horizon), CLEC market share percentage is set to 0. This information is appended into the BACE processing table Q2.

Second, BACE accounts for the fact that a portion of the CLEC services offered are sold as bundles. Similar to the way BACE adjusts the product offerings, the user controls the bundle offerings by adjusting the bundle penetration curves in the Penetration Curves for Bundles table that match up to when the CLEC will offer each bundle (provided by the CLEC Profile Bundles table). This customer/product penetration information is appended into the BACE processing table Q4.

Third, using the percentage of each customer segment taking CLEC products in general (table Q2) and those taking CLEC bundles of products (table Q4) specifically, this step delineates the CLEC market share for each product per period by how the product is sold (i.e., as part of a bundle or *a la carte*). This information is used to update the BACE processing table Q4.

Fourth, BACE retrieves the initial number of total market customers (assumed to include ILEC plus CLEC customers) by wire center, by customer segment and customer-spend category from the Wire center Demographics table.

Fifth, BACE allows the user to identify growth in the number of total market customers, by year, over the 10-year period (in the Market Growth table). This is combined with the Wire center Demographic table to create a total customer curve, representing the change in the number of total market customers year by year.

Sixth, CLEC market share percentages (on a product basis) must be translated into an absolute number of customers taking each CLEC product. BACE calculates this by multiplying the CLEC market share values (table Q4) with the demographics of each customer segment and customer-spend category found in the Wire center Information table (adjusted for market growth). These data are appended into the BACE processing table Q6.

Q. WHAT TASKS ARE PERFORMED IN THE Q-PROCESS AFTER THE NUMBER OF CLEC CUSTOMERS IS DETERMINED?

A. After the first six tasks, the focus changes from determining the numbers of customers subscribing to products to calculating quantities of products sold.

In the seventh task, BACE allows the user to identify changes in the baseline demand (from the Baseline Demand table) per customer segment and sub-segment by product, by year using the Demand Curve table. (Note, user-adjustable changes in quantities of products demanded per customer is different from task 2, which accounted for growth in the number of customers.) The end result provides the expected average customer market demand over time for each product, by study year. These data are added to the BACE processing table Q3.

Eighth, CLEC customer counts by product on a wire center basis are multiplied by the expected per-customer product quantities, by wire center, to determine total CLEC product quantities. Using a mid-year convention, the quantity of CLEC product demanded for the year is calculated as the average of the end of year demand and prior year's end of year demand. Therefore, the amount reported is actually the mid year balance. This information is appended into the BACE processing table QMaster.

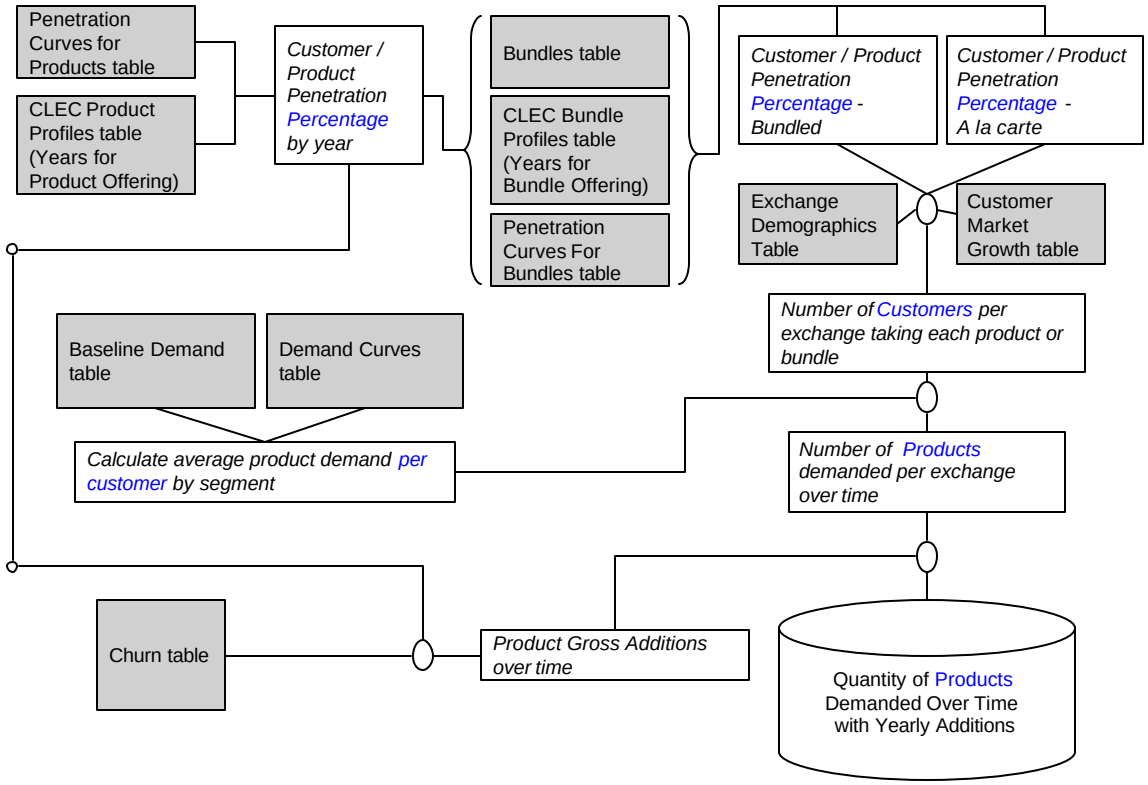
Ninth, BACE calculates the percentage of expected CLEC net additions for each product by year. These percentages are calculated on a product-by-product basis for each customer type. Percentages are derived by applying the disconnect percentages (from the Churn table) to the expected product penetration levels (Penetration Curves for Products table) over the ten years. These net addition percentages are applied to the customer count information in the Wire center Demographic table to derive the counts of customer additions.

Tenth, the count of product quantity additions (over the prior year), are appended into table QMaster. These are used to determine the number of customer/product installs in each year.

Q. CAN YOU ILLUSTRATE THE Q-PROCESS WITH A DIAGRAM?

A. Yes, a diagram summarizing the Q-Process is shown below.

Q-Process: Determine the quantity of products demanded/sold



Section 8: <u>THE REVENUE CALCULATIONS IN BACE (R-PROCESS)</u>

Q. IN GENERAL TERMS, HOW ARE CLEC REVENUES CALCULATED IN BACE?

A. In BACE, the Revenue Process (R-Process) takes information from the Price and Quantity Steps and derives the Gross Revenue due to the CLEC.

Q. WHAT DATA IS USED BY BACE TO CALCULATE REVENUES?

A. Five data tables are used as inputs by BACE in the R-Process. Table P Master contains the CLEC price information for each product by customer type in each served location (wire center) over the ten years of the study. Table Q Master contains the CLEC quantity sold information for each product by customer type in each served location (wire center) over the ten years of the study. Table USF – Interstate Access Support and table USF – High Cost Loop Support provide inputs on the universal service funds available in the state to a CLEC. Finally, table Alternative Units of Measure provides inputs to allow the user to define additional cost drivers for the O and N processes, which are described later in this testimony.

Q. WHAT STEPS ARE USED IN THE R-PROCESS?

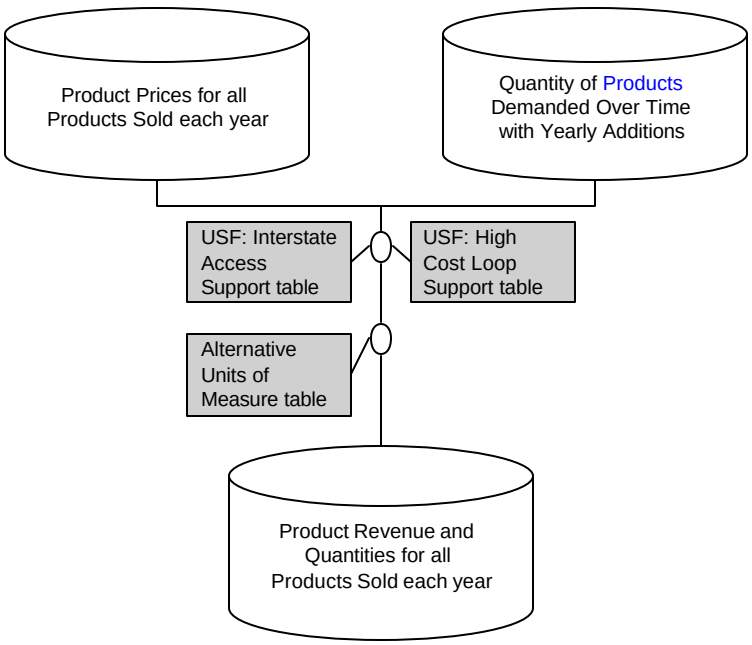
A. The R-Process process is a four-stage process. First, the CLEC quantity of each product demanded (by customer segment and location) from table Q-Master is multiplied by the CLEC price of each product (by customer segment and location) from table P-Master. This information is calculated for each study year and appended into table R-Master as the revenue in each study year. Second, using the universal service funding tables (USF – Interstate Access Support and USF – High Cost Loop Support), the amount of revenue

from these funding sources is appended to the R-Master table. Third, to allow the user to drive costs based on specific product quantities, data from table Alternative Units of Measure is applied against the R-Master table to develop additional quantity records. These records are appended to R-Master. Fourth, the present value of the revenue is derived. The present value is derived on a mid year basis; in other words, Year 1 is discounted six months, Year 2 discounted 18 months, etc, to bring the values back to time zero.

Q. CAN YOU ILLUSTRATE THE R-PROCESS WITH A DIAGRAM?

A. Yes, a diagram summarizing the R-Process is shown below.

R-Process: Determine the revenue (Price x Quantity)



Section 9: COST CALCULATIONS IN BACE (ON-PROCESS)

Q. HOW DOES BACE ACCOUNT FOR CLEC CASH OUTFLOWS?

A. BACE accounts for CLEC cash outflows in the Operations/Network Cost Process (ON-Process). For ease of discussion, I will use the term "cost" to generically refer to cash outflows. The 'N' portion (of the ON-Process) calculates investments and costs specific to the network engineering necessary to originate, transport, and terminate CLEC voice and data traffic. As I noted previously, to create the network infrastructure process, I relied upon network specialists from BellSouth to provide a description of the specific network components that would be required by the CLEC. These components include both CLEC capital investments as well as unbundled network elements and wholesale network services/components. The 'O' Portion calculates cash outflows specific to the operations of the company. Additional detail on the 'N' and 'O' processes can be found in the BACE Methodology Manual, attached to my testimony as Exhibit JWS - 3.

CLEC income tax liabilities (and cash outflows) while part of the O and N processes, are handled as separate step in the processes. The calculation of income taxes will be described in more detail later in this testimony.

Q. IN BACE, WHAT KINDS OF ACTIVITIES CAUSE CASH OUTFLOWS?

A. In BACE, cash flows are caused by (driven by) the following factors: 1) the existence of the CLEC as an operating entity in total (e.g., certain of the sales, general and administrative, SG&A costs); 2) the existence of CLEC service within a geographic area

(e.g., the placement of a switch for each LATA); 3) the acquisition of a customer; 4) the initial choice of a specific product or service by a customer (e.g., the customer chooses to take DSL); 5) the volumes of products and services used; 6) the disconnection of a customer (as evidenced through churn); and 7) composite triggers as the total number of customers or the total volume of products or services within an area can exhaust the usable capacity of equipment (e.g., the number of lines in a wire center), causing the expansion of equipment placed.

Q. WHAT INPUTS ARE REQUIRED FOR THE ON-PROCESS?

A. Several tables provide input to the O and N Process. The tables are described below.

Cost Input Network and Cost Input Operations – these are the key tables in the determination of the costs of the CLEC. The entries in these tables largely determine the magnitude of a CLEC's network infrastructure and operations costs and how these costs are incorporated into the BACE analysis. The tables also allow the user to include cost records that apply to various CLEC network and operational scenarios. From these tables, the ON-Process determines the appropriate cost records to be included in the BACE analyses in accordance with the quantities of products sold obtained from the Q, P, and R processes and user entries in other BACE tables including those that specify cost drivers (as described in the question and answer above).

Within the Cost Input tables for Network and Operations, the fields are used in three ways: 1) as filters or cost triggers (identifying whether a value is relevant to

a particular product or geographic area); 2) as descriptors for ease of understanding and documentation; and 3) as values used for cost calculations.

Inplant and Loadings – this table provides the inputs to turn the material prices of the capital inputs in the Cost Input Network table into fully capitalized costs that could include: engineering, power, land, building, supplies, and other items.

Retirement Inputs – this table provides the inputs required to determine the levels of replacement capital due to the retirement of plant. The inputs are used in the Gompertz-Makem retirement rate estimation approach, described later in this testimony.

Tax Depreciation Schedule – this input contains the IRS MACRS tables. These tables are used in the calculation of federal income taxes.

Q. HOW DOES BACE TREAT CAPITAL EXPENDITURES (CAPEX)?

A. Capital expenditures are treated as any other cash flow and recorded at the time the investment is made. Capital within BACE is deployed as needed based on the quantities of the cost drivers that require the capital. Since some types of plant investments are more economic when built for multiple years of demand, BACE does allow the user to define a time period of demand (DemandYearForBuild field) to use in sizing plant (i.e., the plant placed today is sized sufficiently to meet the demand into future years).

In addition to the initial capital deployment, BACE recognizes that plant retires over time and needs to be replaced. BACE uses a probabilistic approach to retirements based upon the Gompertz-Makem retirement curves. These Gompertz-Makem curves are a standard approach used in the telecom industry to understand the retirement patterns of telecommunications assets. From the use of Gompertz-Makem, BACE derives the probability of retirement, by type of asset, in each year. This probability is used to estimate the expected value of plant replacement in year.

Finally as noted previously, initial start-up investments are assumed to occur at time zero and no discount is applied to the cash outflow. All other capital placements, growth in assets over time and the retirement replacement capital are assumed to occur mid-year for discounting purposes.

Q. DOES BACE USE AMORTIZED COST COMPONENTS FOR DEPRECIATION?

A. BACE uses an amortized measure of depreciation expense only in the income tax module of the model (which I will discuss later) and the associated calculations of accounting net income. For a discounted cash flow calculation, the original cash outflow for the capital expenditure is all that is required; depreciation expense is not needed (and would not be appropriate) for a discounted cash flow, net present value calculation. Since the full cash outlay for the capital expenditure is recorded in the year that it occurs, adding depreciation expense would be tantamount to double counting these costs in a discounted cash flow.

Q. DOES BACE REFLECT A HIERARCHY OF COST INPUTS?

A. Yes. Cost hierarchy inputs, however, are typically for information only and are referred to as descriptor inputs. They are used in reporting to clarify costs to levels of the CLEC location, product or customer hierarchy; in limited cases, they are used as filters. The cost hierarchy is: cost family, cost area, cost center, and cost element.

Q. WHAT IS THE ORDER OF THE TASKS PERFORMED IN THE ON-PROCESS?

A. The Operations and Network ON-Process is split into three major phases. First is the cost preparation phase during which all of the costs are filtered and arranged in preparation for aligning the costs with the results of the price, quantity and revenue processes. The second phase develops appropriate network and operational costs using the cost records prepared in the first phase. The third phase of the ON process incorporates a series of optimization routines to assist in reflecting efficient CLEC operations.

Q. WHAT ARE THE MAJOR TASKS THAT OCCUR IN THE COST PREPARATION PHASE?

A. The following tasks are performed in the cost preparation phase:

1) The first task is to identify all of the possible investment items that can be driven by BACE. This requires resolving all of the wildcard logic that exists in the Network and Operations Cost Input tables. Wildcard inputs and the corresponding model logic are used to minimize the input requirements for the BACE user.

2) Since BACE's network and operations cost tables may have inputs for various alternative network and operational scenarios, BACE has several user inputs that act as filters on the network and operations cost input tables. These include: CLECType, DS1ToDS0XOver, and UseSPAorUNET.

3) BACE applies the user-adjustable scope and purchase power factors to reflect the CLEC's scope of operations and relative purchase power vis-à-vis BellSouth.

4) Loadings are applied to capital investments. These loadings allow the user to capture capital expenditures beyond the material price. These may include: engineering, supplies, storage/warehousing, land, power, building, and other items.

5) BACE identifies how the vendor prices and investment values will change over the 10-year study. These factors are a user input into the Cost Trends table.

6) The implications of customer churn are considered. The rate of customer churn has an impact on how often some costs will occur. This is reflected in the Weight value in the Cost Input tables

7) Next, to accommodate the fact that a CLEC, by installing certain equipment in a LATA, may be able to serve customers via UNEs from carriers other than BellSouth within that same LATA, BACE includes a variable accounting for the percentage of these UNE-available customers within each LATA that are served by BellSouth. This allows BACE to apportion some of the fixed costs within a LATA to both the BellSouth operating area and the other ILECs within the LATA.

8) BACE translates all monthly non-capital recurring costs into annual cost amounts (since the present value calculations are performed on an annual basis).

Q. WHAT ARE THE MAJOR TASKS THAT OCCUR IN THE NETWORK REQUIREMENT AND COST DEVELOPMENT PHASE?

A. With the appropriate cost records identified, annualized, and trended through time, BACE develops the foundation for determining costs incurred by the CLEC by calculating the underlying service and equipment requirements. Results from the Q-Process that identify demand (where appropriate) for each of the various levels of the product, customer, and location hierarchies provide the basis for establishing an appropriately sized CLEC network architecture.

For network equipment purchased by the CLEC, determining the appropriate equipment and number of units to install relies on network engineering rules and equipment capacities. Practically, CLEC engineers would likely examine demand forecasts for a period of time (the time frame is dependent on the type of equipment), work with vendors to identify the equipment appropriate to meet the demand, and purchase equipment sufficient to accommodate the expected demand, any administration requirements, spares and perhaps growth. The identification of the number of capital cost units to install within BACE is similar to this process.

For each of the capital cost records, BACE develops the demand requirements in each year based on the product, customer, and location hierarchies specified in the Network Cost Input table (based upon output of the Quantity process). BACE accounts for the years to build for and minimum/maximum ranges for sizes of network components.

For non-capital cost records that have a Frequency of Recurring or NonRecurring, BACE uses the demand requirements in each year (from the Q Process) based on the product, customer, and location hierarchies and the UNEZone and RateCenter entries in the Network and Operations Cost Input tables to determine the year by year cash outflows. For capital components and non-capital cost records that have a Frequency of NonRecurring Network, BACE uses the incremental change in demand year over year to determine the year-by-year cash outflows.

Next, BACE determines the replacement capital expenses based upon the retirement of plant. Based on the user entered asset class specific values in the Retirement Input table, Gompertz-Makem survival curves are used to estimate the likelihood of retirement in each year.

Finally, with the costs of each network component and/or service developed for each year of the 10-year period based on demand, BACE develops the net present value for each cost record using the methods I described earlier. Whether the terminal values of assets (at the end of the 10 years) is included or ignored (i.e., assumed to zero) in this calculation is user adjustable.

Q. WHAT ARE THE MAJOR TASKS THAT OCCUR IN THE NETWORK OPTIMIZATION PHASE?

A. With the NPV of each cost record identified, BACE lets the user control the ability to identify economically efficient ways for the CLEC to optimize its operations. BACE provides for seven types of optimization processes, six of which are user adjustable. The

optimization processes each search for specific activities that yield a negative net present value, and then eliminate that activity. The seven activities that can be optimized are: 1) the use of EELs and/or full end-office collocation; 2) the provision of DSL within the wire center (not user adjustable); 3) keep or eliminate CLEC service in total for a wire center; 4) keep or eliminate CLEC service for Mass Market customers for a market; 5) keep or eliminate CLEC service in total for Enterprise customers for a market; 6) keep or eliminate CLEC service for a market; and, 7) keep or eliminate CLEC service in total for a LATA.

Q. EARLIER YOU DESCRIBED HOW BACE IS CONSISTENT WITH THE TRO. WOULD YOU PLEASE DESCRIBE IN ADDITIONAL DETAIL HOW BACE CAPTURES THE COST CATEGORIES DISCUSSED IN THE TRO?

A. Yes. BACE is designed to allow the user to capture all likely potential costs corresponding to CLEC entry. Below, I list the cost items specifically mentioned in the TRO, and how each item is incorporated into BACE.

1) "Costs of purchasing and installing a switch" (TRO, ¶ 520) - Incorporated into table Cost Input Network.

2) "[T]he recurring and non-recurring charges paid to the incumbent LEC for loops" (e.g., TRO, ¶ 520, and n. 1588) - Incorporated into table Cost Input Network.

3) "[T]he recurring and non-recurring charges paid to the incumbent LEC for … transport" (e.g., TRO, ¶ 520, and n. 1588) - Incorporated into table Cost Input Network.

4) "[T]he recurring and non-recurring charges paid to the incumbent LEC for … hot cuts" (TRO, ¶ 520) and "… costs of migrating incumbent LEC loops to

requesting telecommunications carriers' switches …" (Appendix B – Final Rules, page 22, 51.319(d)(2)(iii)(B)(3)) –- Incorporated into table Cost Input Network.

5) "[T]he recurring and non-recurring charges paid to the incumbent LEC for … signaling" (TRO, ¶ 520) - Incorporated into table Cost Input Network.

6) "[T]he recurring and non-recurring charges paid to the incumbent LEC for … other services and equipment necessary to access the loop" (TRO, ¶ 520) - Incorporated into table Cost Input Network.

7) "[T]he cost of collocation and equipment necessary to serve local wire center customers in a wire center" (TRO, ¶ 520) - Incorporated into table Cost Input Network.

8) "… taking into consideration an entrants likely market share" (TRO, ¶ 520) - Incorporated into table Penetration Curves for Products.

9) "taking into consideration … the scale economies inherent to serving a wire center and the line density of the wire center" (TRO, ¶ 520) - Incorporated in BACE's approach to cost development.

10) "taking into consideration … the cost of backhauling the local traffic to the competitor's switch" (TRO, ¶ 520, and similar language at Appendix B – Final Rules, page 22, 51.319(d)(2)(iii)(B)(3)) - Incorporated into table Cost Input Network.

11) "taking into consideration … other costs associated with transferring the customer's service over to the competitor" (TRO, ¶ 520) - Incorporated into table Cost Input Network.

12) "taking into consideration … the impact of churn on the cost of customer acquisitions" (TRO, ¶ 520) - Incorporated into table Churn and table Cost Input Network.

13) "taking into consideration … the cost of maintenance, operations" (TRO, ¶ 520) - Incorporated into table Cost Input Operations.

14) "taking into consideration … the cost of … other administrative activities" (TRO, ¶ 520) - Incorporated into table Cost Input Operations.

15) "taking into consideration … the competitors' capital costs" (TRO, ¶ 520) - Incorporated into table CLEC Study Properties.

Q. IS BACE THEREFORE DESIGNED TO REFLECT ANY COST DISADVANTAGES OR ADVANTAGES THE CLEC MAY FACE?

A. Yes. BACE is designed to be able to capture all of the costs of the CLEC, whether these represent cost disadvantages or cost advantages (vis-à-vis an ILEC).

Section 10: TREATMENT OF INCOME TAXES IN BACE

Q. HOW ARE INCOME TAXES TREATED IN BACE?

A. The final step in BACE processing is the calculation of the income tax liability. The calculation of tax liability (profit/positive liability as well as any loss/negative liability) uses inputs from the core of BACE, but the tax calculations are essentially performed in a separate module. This is because unlike discounted cash flow calculations of net present value, income taxes for most corporations are calculated on an accrual basis.

Q. HOW IS THE ACCRUAL TREATMENT OF ASSETS (E.G., FOR TAX CALCULATION PURPOSES) DIFFERENT FROM CALCULATIONS OF NET PRESENT VALUE OF CASH FLOWS?

A. With cash flow calculations, the cash outlay for an asset is simply shown in its entirety at the time it occurs. For tax purposes, under the accrual method, a capital expenditure generates tax-deductible expenses over time via depreciation expense.

Q. HOW IS THE COST OF DEBT AND EQUITY TREATED FOR TAX PURPOSES AND IN THE CASH FLOW PORTION OF BACE?

A. For corporate income tax purposes, the cost of debt is reflected as a tax-deductible expense like other expenses. For corporate income tax purposes, the cost of equity is the one economic cost that is not considered a tax-deductible expense. In discounted cash flow calculations, the cost of debt and the cost of equity are reflected via the discount rate; i.e., when a cash outflow is made in time zero, but revenue (cash inflows) occur at future time periods, the discount rate implicitly captures the costs of debt and equity as the future revenue cash inflows are discounted.

Q. HOW ARE LOSSES FOR ANY GIVEN YEAR TREATED IN BACE?

A. The user can choose how a tax loss (a negative tax liability) will be treated. The user has the option of carrying any loss forward to future years to offset future taxable profits, or taking the loss during the year in which is incurred as a current offset to current taxable profits in other divisions. If the user selects "CurrentYearCredit," the tax loss is actually

shown as a contra-expense in that year for cash flow purposes. This selection implies that the CLEC has other "profitable" business entities, and that the modeled operations loss will be used to offset some portion of the total CLEC tax liability created from accounting profits in its other operations. Otherwise, the loss is carried forward to offset future profits.

Q. DOES BACE ESTIMATE NET INCOME FOR TAX PURPOSES?

A. Yes. Once the user selects the Tax-treatment method, BACE calculates an estimated net income statement for tax calculation purposes. This includes an estimate of the yearly tax depreciation (which is based on the IRS's depreciation lives for each of the plant items in BACE). In addition, an estimate of the yearly interest expense is made using the sum of the capex in the current period and from succeeding periods multiplied by the debt percentage (1-EquityPct) and a debt rate calculated in the model from the user's inputs in the CLEC Study Properties for EquityPct, EquityRate, PreTaxCostOfCapital.

From the net income statement, the model calculates the estimated annual income taxes based upon an effective tax rate that is based on the user inputs in the CLEC Study Properties for StateTaxRate and FedTaxRate. The effective tax rate accounts for the fact that state taxes impact federal tax liabilities.

Q. FOR EASE OF REPORTING, DOES BACE ASSIGN INCOME TAXES TO PRODUCTS AND GEOGRAPHIC AREAS?

A. Yes. Once the estimated income taxes are calculated, a tax-to-NPV ratio is developed so that the income taxes can be apportioned down to the reporting levels in BACE. This apportionment is only performed to allow the user to analyze impairment using any of the various data dimensions in the model.

Section 11: REPORTS FROM BACE

Q. WHAT REPORT GENERATING CAPABILITIES EXIST IN BACE?

A. Several standard reports are available through the BACE wizard and from predefined report templates. In addition, there is a very wide array of reports and data views that can be user defined.

Q. WHAT STANDARD REPORTS ARE AVAILABLE THROUGH THE BACE WIZARD?

A. The four major categories of reports available through the BACE wizard are: 1) NPV by market; 2) average revenue by product category per customer by market; 3) total estimated net income; and 4) total estimated net income per line.

Q. WHAT ADDITIONAL REPORTS ARE AVAILABLE THROUGH BACE?

A. BACE comes pre-populated with a number of report templates. These templates can be used to create various reports including: cost and revenues over time, cost summaries, negative margin markets, etc. User-defined reports and data views can vary widely. The

limits of the possible reports are largely determined only by the data used by and produced by BACE. Typically, a user-defined report is determined with four steps: 1) identify the data source (e.g., revenue and cost); 2) identify the calculations within BACE to view (e.g., NPV by customer segment by year); 3) identify any desired selection criteria (e.g., specific level of geography or geographic area); and 4) describe how the data is to be reported. An example of a user-defined report is one showing all operating expenses in a state for two specific LATAs for the 10-year study. BACE allows the user to save reports and report templates.

Section 12: TESTING BACE

Q. HAS BACE BEEN TESTED AS A MODEL?

A. Yes. My team and I tested BACE to confirm it worked logically (i.e., implementation corresponding to intent, processes proceeded logically), to confirm it worked technically (i.e., the model processes are mathematically correct); and to identify problems or errors in the model and to identify improvements to the model.

Q. WHAT TYPES OF TESTS WERE PERFORMED?

A. Four types of tests were performed: 1) transactional tests (which focused largely on the P, Q, and R processes); 2) output reasonableness tests (which focused on the overall results and the change in results as input values changed); 3) processing tests (running the model and reports in various ways); and 4) platform mechanics test (e.g., that it loads properly and runs with the hardware specified).

Q. WHAT DO YOU MEAN BY TRANSACTIONAL TESTING?

A. The logic of each process was broken down into key steps and the key components and drivers of the process were identified. Tests were designed to confirm that the processes handled the driver (or variable) correctly and that the system's calculations were mathematically correct.

Q. WHAT WERE THE RESULTS OF YOUR TESTING?

A. BACE passed all four types of testing.

Q. FOR THOSE USERS CHOOSING TO EVALUATE BACE AT A DETAILED LEVEL, WHAT IS AVAILABLE TO ASSIST THEM?

A. Several things.

1) I have provided a detailed Users Guide (Exhibit JWS-2);
2) I have provided a detailed Methods Manual (Exhibit JWS-3);
3) Within the Methods Manual is a data dictionary and table layout;
4) I have provided the BACE model source code in .pdf format (Proprietary Exhibit JWS-4);
5) BellSouth offers, at no charge, BACE model support, by telephone or email;
6) I provided public workshops of the model at the November 2003 NARUC meetings and at the Alabama Commission on December 11, 2003, and at other forums;

7) The majority of inputs (all non-proprietary) are user adjustable so that changes can be made to test impacts and sensitivities;

8) Various scenarios can be run either through the wizard or by modifying inputs and creating scenarios directly;

9) Within the BACE model itself, there is a linked database file (the file name is "Scenario"_Intermediate.MDB which resides in the "Scenario" folder) that allows the user to view non-sensitive intermediate processing tables for scenarios based upon the proprietary BellSouth customer data; and,

10) Within the BACE model itself, there is a BACE Demonstration scenario ("Demo") that has all inputs fully open for review. (The "data" in the BACE Demo is only for purposes of illustration and should not be interpreted or construed to reflect values for any particular market or geographic area.) In addition, the processed Demo scenario is open for review. (If a password request appears when opening the database files in the folder, the password is "demo" in lower case.) Through the use of the Demo scenario, the user can see the structure of the system and tables, all intermediate tables, and follow the processing of the model.

With these capabilities, the user should be able to track through the BACE system much in the same way as I (and my team) have in developing, testing and refining BACE.

Q. THE DEMONONSTRATION SCENARIO DOES NOT HAVE ACTUAL DATA. WHY ARE CERTAIN TABLES AND INTERMEDIATE RESULTS STILL LOCKED FROM THE USERS' VIEW IN THE FULL BACE MODEL?

A. BACE uses a proprietary database containing commercially sensitive and valuable information. Naturally, this data has to be protected. My objective in developing BACE is to make the model as open and easy to use, review, and evaluate as possible, while still protecting this sensitive and powerful database. Certainly, with this filing today, BACE users have reasonable opportunities to use, review, and evaluate the model.

Q. WHAT INPUTS CANNOT BE MODIFIED BY THE USER IN BACE?

A. The user cannot modify the initial input values for market prices and quantities. These "locked" quantities include both the total number of customers and the number of each product category sold. The user has the ability, however, to control modeled CLEC prices via the CLEC price discount and the bundle price inputs. The user also can control the CLEC quantities via the CLEC market penetration inputs.

Q. WHY IS THE USER NOT ALLOWED TO MODIFY THE UNDERLYING MARKET PRICE AND QUANTITY INPUTS?

A. First, the user has the ability to create CLEC prices and quantities without adjusting the underlying data. Second, the underlying market price and quantity information is proprietary and it is not possible to protect this proprietary information and still allow the user to change the information. There is a modeling trade-off between allowing the user to change every input and having a model that uses detailed, powerful, and proprietary data. The clearly superior choice is to use powerful data and provide other methods for the user to obtain modeled CLEC prices and quantities without changing the underlying market data.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.